UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/834,923	04/16/2001	Shigeo Onishi	925-190	9436

7590 07/17/2002

NIXON & VANDERHYE P.C.
8th Floor
1100 North Glebe Road
Arlington, VA 22201-4714

EXAMINER	
MALDONADO, JULIO J	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 07/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/834,923	ONISHI, SHIGEO	
	Examiner	Art Unit	
	Julio J. Maldonado	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 May 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) *8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3 and 5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claims 1, 2, 4, 5, 7 and 9 rejected under 35 U.S.C. 102(e) as being anticipated by Hieda et al. (U.S. 6,335,241).

In reference to claims 1, 2, 4 and 5, Hieda et al. (Figs.1-5 and 18-23) in a related method to form a stacked DRAM capacitor teach the steps of sequentially forming an interlayer insulating film (14) and a barrier film (15/21) comprising silicon nitride on a semiconductor substrate (1); making a contact hole in the barrier film (15/21) and the interlayer insulating film (14) and forming a plug (20) within the contact hole; forming an insulation film (22) on the plug (20) and the barrier film (15/21) and then forming a hole leading to the plug (20) in the insulation film (22) such that an upper surface of the plug (20) is exposed; forming a first conductive film in the insulation film (22) such that the hole is filled with the first conductive film, and then etching the first conductive film by a chemical mechanical polishing to thereby form a lower electrode (24) within the hole; etching the insulation film (22) until the barrier film (15/21) is exposed, so as to leave the

lower electrode (24) in a protuberant manner; forming a dielectric film (26) that covers the protuberant lower electrode (24) and the barrier film (15/21), and then forming a second conductive film (27) that covers the dielectric film (26), said dielectric film (26) being made of a ferroelectric or high-dielectric-constant substance; and patterning the dielectric film and the second conductive film simultaneously to thereby form a capacitor dielectric film and an upper electrode (column 10, line 5 – column 16, line 7). Also, in reference to claim 4, Hieda et al. in another embodiment of the invention (Figs.24-25) teach forming a cup-shaped capacitor including the steps of forming a first conductive film over the first insulation film and within the hole such that the first conductive film within the hole does not fill the hole but covers the surfaces defining the hole, and then forming a second insulation film on the first conductive film so as to fill the hole; etching the second insulation film until an upper surface of the first conductive film is reached, and then etching the first conductive film and the second insulation film in the hole by a chemical mechanical polishing method until the first insulation film is exposed, to thereby form a cup-shaped lower electrode within the hole; and etching the first insulation film and the second insulation film within the hole until the barrier film (15/21) and the lower electrode (24) are exposed (column 16, line 63 – column 17, line 47).

In reference to claims 7 and 9, Hieda et al. teach the second conductive film is formed such that a gap defined between opposite surfaces of the dielectric film within the hole is filled with a part of the second conductive film (see Fig.25B); and a part of the upper electrode fills a gap defined between opposite surfaces of the dielectric film within the hole (see Fig.25B).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hieda et al. ('241) in view of Nishioka et al. (U.S. 5,656,852).

In reference to claims 3 and 6, Hieda et al. substantially teach all aspects of the invention but fail to show forming a TiO_2 film on the first insulation film. However, Nishioka et al. in a related art to high-dielectric constant capacitors teach depositing TiO_2 after depositing a dielectric film comprising silicon oxide. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to deposit TiO_2 after the formation of a dielectric layer as taught by Nishioka et al. in the capacitor structure of Hieda et al., since using combination of more than one dielectric layers is well-known in the art (see table 7, drawing element 32).

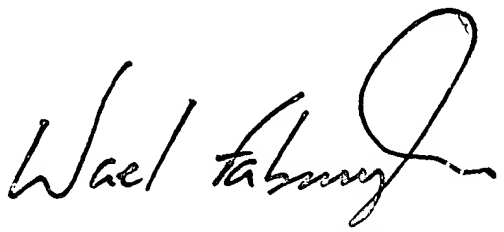
Conclusion

5. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (703) 308-4918.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.

Julio J. Maldonado
Patent Examiner
Art Unit 2823
703-306-0098
julio.maldonado@uspto.gov



SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800